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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/965,094	09/28/2001	Roy C. Iggulden	2001 P 18160 US	3397

7590 07/09/2003

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EXAMINER

DEO, DUY VU NGUYEN

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 07/09/2003

4

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/965,094

Applicant(s)

IGGULDEN ET AL.

Examiner

DuyVu n Deo

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 28 September 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☒ Claim(s) 1 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-11 are rejected under 35 U.S.C. 102(b) as being anticipated by Lou et al. (US 6,110,826).

Referring to claims 1, 5, 6, Lou describes a method for forming a dual damascene structure comprising: etching line trench pattern into the intermetal dielectric layer (col. 6, line 1-4) and coating the line trench pattern with a liner, such as Ti/TiN (col. 6, line 16-29) (this would read on claimed a given damascene structure coated by a liner); removing the liner everywhere excepting the sidewalls of the trench (col. 6, line 30-31) (this would read on claimed the liner which purposely provides poor step coverage into the afore mentioned structure); depositing W by CVD and performing CMP on the W to planarize the metal (col. 6, line 60-col. 7, line 5) (this would read on claimed followed by a CVD W deposition and followed by a metal isolation technique).

Referring to claim 2-4, the liner is a TiN and depositing by PVD (col. 6, line 26-29). Since the deposition process is the same as that of the claimed invention, this would also read on claimed the liner is deposited in a way to provide poor step coverage like quick deposition.

Referring to claim 7, the dual damascene further comprises an etch-stop silicon nitride layer (col. 5, line 49-50).

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Referring to claims 8, 10, 11, the method further comprises etching through the line trench pattern in a first photoresist layer into the IMD layer until the etch-stop is reached using gases of O₂, He, and CF₄ (col. 5, line 65-col. Line 7) and etching through the contact hole pattern in a second photoresist layer into the ILD layer using gases of Ar, CHF₃, and C₄F₈ (col. 6, line 48-52).

Referring to claim 9, the method further comprises cleaning the contact hole by RIE (claim 14).

Claim Objections

3. Claim 1 is objected to because of the following informalities: the limitations of claim 1 are not written as steps of a method. For the clarity, they should be written into individual step. Appropriate correction is required.

Claim Rejections - 35 USC § 112

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 4 is indefinite because the limitation "etc, refer to list in description" includes elements not actually disclosed, thereby rendering the scope of the claim unascertainable.

6. Claim 7 recites the limitation "said etch-stop". There is insufficient antecedent basis for this limitation in the claim.

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7. Claim 8 recites the limitation "said etching through said contact hole pattern in said second photoresist layer into said ILD layer". There is insufficient antecedent basis for this limitation in the claim.
8. Claim 9 recites the limitation "said cleaning". There is insufficient antecedent basis for this limitation in the claim.
9. Claim 10 recites the limitation "said etching through said line trench pattern of said first photoresist layer into said IMD layer". There is insufficient antecedent basis for this limitation in the claim.
10. Claim 11 recites the limitation "said etching through said line trench pattern in said first photoresist layer into said IMD layer". There is insufficient antecedent basis for this limitation in the claim.

Specification

11. The disclosure is objected to because of the following informalities: the brief description of the drawings in line 28 describes figure 3e; however, there is no figure 3e in the drawing. At this time it will be understood as figure 1e.

Appropriate correction is required.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to DuyVu n Deo whose telephone number is 703-305-0515.

DVD
July 8, 2003

Q/d